

Conserving Energy in a Data Processing System by Selectively Powering Down Processors

ABSTRACT

5 A system and method for selectively activating and deactivating processors in a multi-processor system environment in response to variations in the demand for CPU processing power presented to the system. During periods of reduced processing activity, the system may select one or more of its processors for deactivation. If the processing activity subsequently increases, the number of processors may be increased to insure that a minimum specified performance or
10 response requirement is achieved. The system may include or employ various hardware facilities and/or software modules to monitor the system's workload, typically measured in terms of the demand for CPU cycles. The system may include a policy manager that receives workload information from the workload module and determines the required number of processors based on a predetermined performance criteria. In addition, the system may include a resource pool
15 module that determines which processors are to be activated and deactivated in response to changes in the required number of processors as determined by the policy manager. The resource pool module may be further responsible for preparing a selected processor for deactivation by migrating any processes or thread running on the selected processor to other processor(s) in the pool of available processors and by flushing the contents of the selected
20 processor's cache memory. The system may further include a CPU power control module that is configured to transition a processor selected for deactivation from a full power state to a low-power state.